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## The role of autonomy supportive activities on students' motivation and beliefs toward out-of-school activities

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### ABSTRACT

Physical education in elementary education usually provides children's first contact with sports. According to the trans-contextual model of motivation, physical education teachers can positively influence children's beliefs toward and actual leisure time physical activity behavior. The aim of this study was to examine the effect of a dance-based physical education program on motivation regarding physical education lesson participation, as well as leisure time physical activity participation. The sample consisted of 252 pupils attending Grades 5 and 6 of elementary school ( $M_{\text{age}} = 10.48$  years,  $SD = 0.50$  years). Participants were randomly assigned into three groups. The first group attended a physical education lesson based on various forms of dance, the second one attended lessons with Greek traditional dances only, and the third group served as active control group that attended the typical curriculum. The intervention lasted six weeks. Before and after the intervention, students completed survey-based measures of motivational climate, motivational regulations in physical education and leisure time, enjoyment, attitudes, perceived behavioral control, subjective norms, and intentions toward leisure time physical activity. In support of the trans-contextual model, results showed that students in the dance intervention programs scored significantly higher in perceptions of motivational climate and beliefs toward leisure time physical activity. The findings of the study suggest that dancing lessons at school can bolster more positive attitudes and beliefs toward physical education and leisure time physical activity.

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Regular physical activity during childhood has been associated with positive physiological and psychological development and well-being (Biddle & Asare, 2011). School-based physical lessons in elementary education is primarily concerned with the promotion of physical activity in students, and it has been found to significantly contribute to health promotion and physical activity participation in young people (Shephard & Trudeau, 2000). The health-enhancing benefits of school-based physical activity can be maximized through participation in leisure time physical activity (Sallis et al., 1997). Past research has demonstrated that elements of the physical education lesson at school, such as teaching style, and pedagogical methods and practices can enhance physical activity participation both in school and in leisure time (Ciani, Ferguson, Bergin, & Hilpert, 2010). For example, the promotion of autonomous forms of teaching (Tomasetto, 2004), mastery-oriented climate (Barkoukis, Tsorbatzoudis, & Grouios, 2008), and autonomy supporting environments (Barkoukis, Hagger, Lambropoulos, & Tsorbatzoudis, 2010; Hagger & Chatzisarantis, 2016; Hagger, Chatzisarantis, Barkoukis, Wang, & Baranowski, 2005; Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003) are educational strategies that have been used to enhance students' motivation to participate in school physical education and in leisure time physical activity. This line

of research has been largely relied on the premises of the trans-contextual model of motivation (Hagger et al., 2003).

### Trans-contextual model of motivation

The trans-contextual model of motivation (Hagger et al., 2003) is a comprehensive theoretical model of motivation that integrates components of self-determination theory (Deci & Ryan, 1985, 2002), the hierarchical model of intrinsic and extrinsic motivation (Vallerand, 2007) and the theory of planned behavior (Ajzen, 1985, 2002).

### Self-determination theory

One of the main tenets of self-determination theory is that there are different types of motivation, namely intrinsic and extrinsic motivation, and amotivation (Deci & Ryan, 2002). Intrinsically motivated people engage in a behavior because of the interest, enjoyment, and satisfaction derived from participation in the activity, without any concerns or expectations about external rewards and extrinsic reinforcement (e.g., achieving a high mark in physical education classes). On the other hand, extrinsically motivated people engage in

a behavior to obtain external rewards or avoid punishment. In this sense, activity engagement is not a result of choice due to satisfaction of performing the activity, but rather a choice of obtaining more tangible benefits from the activity. Finally, amotivation refers to a lack of intention to perform an activity and is closely related with learned helplessness (Deci & Ryan, 2000).

The different types of motivation reflect different levels of self-determination. Intrinsic motivation is characterized by high levels of self-determination whereas amotivation is characterized by low levels. Extrinsic motivation is associated with varying levels of self-determination, depending on the component motivational regulation involved (Deci & Ryan, 2008, Deci & Ryan, 2010). More specifically, four different regulations have been identified in the theory; integrated, identified, introjected, and external regulations. Integrated regulation represents a full integration of the value of the behavior at hand. Identified regulation, reflects engagement in an activity because it is favorably evaluated by the person and is aligned with personal values. Introjected regulation describes activity engagement to achieve positive emotional states or avoid negative ones. Finally, external regulation represents engagement in an activity to obtain reward or avoid punishments (Deci & Ryan, 2008). Several meta-analyses have illustrated that specific motivational regulations (i.e., integrated and identified regulations) are associated with increased effort, persistence, and satisfaction among individuals engaging in tasks in achievement contexts, whereas controlling types of motivation such introjected and external regulations and amotivation have been associated with maladaptive performance and behavioral outcomes (Cerasoli, Nicklin, & Ford, 2014; Chatzisarantis, Hagger, Biddle, Smith, & Wang, 2003; Ng et al., 2012). In addition, according to self-determination theory, the social environment can influence people's motivational regulations. Research evidence showed that autonomous supportive environments promoted self-determined motivational regulations (Reeve, 2009; Reeve & Jang, 2006; Su & Reeve, 2011).

### **Hierarchical model of intrinsic motivation**

Based on self-determination theory Vallerand (1997) proposed a hierarchical model of intrinsic motivation, investigating the determinants and consequences of motivation in different levels of generality (Vallerand, 2007; Vallerand & Ratelle, 2002). Three levels of generality have been identified, namely global, contextual, and situational levels. Motivation at the global level is general, stable, represents motivational dispositions, and reflects the basic needs for self-determination or autonomy (Guay, Mageau, & Vallerand, 2003). At the contextual level, motivation is less stable in specific social contexts, such as work, family, education, sport, and leisure. In related contexts, such as education and leisure, motivation in one context can influence the respective motivational processes in the other, so that school-based physical activity participation can motivate participation in leisure time physical activity

(Vallerand & Ratelle, 2002). Last, at the situational level motivation reflects the regulation operating in a specific situation, for instance motivational regulations during the lesson (Guay et al., 2003).

### **Theory of planned behavior**

The theory of planned behavior is a social-cognitive theory developed to understand volitional behavior (Ajzen, 1985, 2002). The most influential predictor of behavior is the intention to perform the behavior at hand. The theory identifies three main predictors of intentions, namely attitudes toward the behavior (i.e., the individual's positive or negative evaluation of the behavior), subjective norms (i.e., perceived social approval of the behavior in question), and perceived behavioral control (i.e., the perceived control over or easiness/difficulty of performing the behavior in question). Higher scores in attitudes, subjective norms, and perceived behavioral control are associated with stronger behavioral intentions to perform the behavior, which, in turn, predict actual behavior (Cooke & French, 2008; Webb & Sheeran, 2006). The theory of planned behavior has been widely used for predicting physical activity-related behaviors in different contexts and across age groups (Downs & Hausenblas, 2005; McEachan, Conner, Taylor, & Lawton, 2011).

### **Integration of the theories**

Each of these theories contributes to the formation of the trans-contextual model (Hagger et al., 2003; Hagger, 2009). More specifically, self-determination theory (Deci & Ryan, 1985) provides information about the different types of motivation and the influence of social context on motivational processes. The hierarchical model of intrinsic and extrinsic motivation described how motivation in one context influences motivation in other similar contexts (Vallerand, 1997, 2007), and the theory of planned behavior (Ajzen, 1985) describes the social cognitive variables that predict intentions and actual behavior (Barkoukis & Hagger, 2013; Hagger & Chatzisarantis, 2016). The integration of these theories is conceptually coherent as they are compatible and complementary (Deci & Ryan, 1985, 2000, Motl, 2007; Vallerand, 1997). Motivational constructs described in self-determination theory are associated with cognitive, affective, and behavioral outcomes described in the theory of planned behavior. For instance, Deci and Ryan (1985) argued that autonomous motivation toward a specific behavior is related to the beliefs toward performing this behavior and the formation of intentions to enact the behavior in the future. Furthermore, Deci and Ryan (2000) stated that the psychological mechanism described in social-cognitive theories, such as the theory of planned behavior, is initiated by a cognitive representation of future desired state, which, in fact, reflects the motivational constructs described in self-determination theory. In addition, past evidence demonstrated that people have the tendency to align their beliefs with their motivational orientations (McLachlan & Hagger, 2011a, 2011b). Therefore, the integration of the theories

and the specific constructs in the trans-contextual model is conceptually coherent and relevant (for a more detailed discussion on conceptual integration, see Hagger & Chatzisarantis, 2016).

The trans-contextual model assumes that an autonomy supportive environment in physical education lessons will increase autonomous motivation in school-based physical education. In turn, autonomous motivation for school-based physical education will enhance autonomous motivation to partake leisure time physical activity. This motivational process is assumed to initiate actual engagement with leisure time physical activity through the development of more positive attitudes, subjective norms, perceived behavioral control, and stronger behavioral intentions (Hagger et al., 2003). So far, several studies have confirmed the model's predictions and validated its hierarchical structure. The contribution of each theory is considered theoretically sound and Hagger and his associates (Hagger & Chatzisarantis, 2012, 2014, 2016; Hagger et al., 2003) justified the model's propositions, the role and the order of the model's variables, and provided meta-analytic evidence supporting the pattern of effects described in the model. Therefore, it is considered a sound theoretical approach linking school physical education with leisure time physical activity.

A large body of research has also supported the key tenets of the transcontextual model and showed that the model adequately explains the mechanism through which physical education lessons can promote leisure time physical activity in young people (Barkoukis & Hagger, 2009; Barkoukis et al., 2010; Hagger & Chatzisarantis, 2012, 2014, 2016; Hagger et al., 2003; Hagger et al., 2005; Hagger et al., 2009; Pihu, Hein, Koka, & Hagger, 2008; Shen, McCaughtry, & Martin, 2007; Shen, McCaughtry, & Martin, 2008).

One of the key findings in this line of research is that an autonomy supportive climate is expected to have a positive influence on students' beliefs and behaviors both during the lesson and leisure time physical activities. So far, autonomy support in the school classroom has been largely studied as the result of the student-teacher interaction. In this context, Reeve (2009) defined autonomy support as the interpersonal sentiment and behavior that teachers provide during instruction to identify, nurture, and develop students' inner motivational resources (p. 160). Autonomy supportive teachers ask what students want, provide rationale, offer encouragements and hints, are responsive, and allow sufficient time to students to engage with learning and teaching (Reeve & Jang, 2006). Yet, the teaching approach used can provide opportunities for further provision of autonomy support to the students (Jang, Reeve, & Deci, 2010). Physical education curricula largely focus on the development of sport skills and physical competence, and knowledge of basic sports. For instance, using games-based approaches in physical education teaching has resulted in increased autonomy perceptions among students, as compared with more traditional teaching approaches (Smith, 2010).

Similarly, the content of the lesson can also provide opportunities for autonomy support as different teaching subjects offer different opportunities for autonomy support.

For instance, dance can promote perceptions of autonomy, especially when it involves free dance styles that involve a more spontaneous form of expression without specific movement patterns or movement patterns that can easily be adapted by the performer. These types of dance encourage people to form groups and express themselves freely using their own prior experiences, abilities, imagination and creativity. For instance, Craft (2005) and Lavin (2008) suggested that including free dance styles in the lesson can help students develop their creativity and imagination through an autonomy supportive way. This is achieved as this type of dance promotes collaboration and communication among the students. It also allows students work on their own pace, share their experiences and express their feelings, and adjust the content of the dance to their own abilities (Bergmann, 1995; Von Rossberg-Gempton, Dickinson, & Poole, 1999).

### The present study

Past evidence showed that the trans-contextual model of motivation adequately describes the processes through which the physical education lesson can influence leisure time physical activities (Barkoukis & Hagger, 2013; Hagger & Chatzisarantis, 2012). When studying the effect of teaching practices in the physical education lesson, it would be important to explore their influence on students' out-of-school beliefs and behaviors. In this effort the trans-contextual model of motivation can provide a sound theoretical basis. So far, there is scarce research evidence on the effect of innovative teaching practices, such as free dance in physical education lessons, on students' motivation and beliefs about physical education and leisure time physical activity. The present study was designed to address this need by investigating the effectiveness of a program involving dancing activities promoting students' autonomy (Group A) in fostering the motivational sequence proposed by the trans-contextual model by forming autonomous motivation for physical education and for leisure time physical activity, and promoting positive beliefs toward leisure time physical activity. Two alternative programs, one combining traditional dances and games (Group B) and one including games only (Group C), were used as control groups. It was hypothesized that students attending Group A will demonstrate (a) higher perceptions of autonomy support; (b) higher autonomous and lower controlled motivation in physical education; (c) higher autonomous and lower controlled motivation in leisure time physical activity; (d) higher enjoyment and effort in physical education lessons; (e) more positive attitudes toward leisure time physical activity; and (f) higher subjective norms, perceived behavioral control, and intentions toward leisure time physical activity as compared with students attending Groups B and C.

### Method

#### Sample

The sample of the study consisted of 252 students (132 girls, 120 boys) attending Grades 5 and 6 in elementary school.

Students were attending five typical coeducational schools in the island of Corfu, Western Greece. The schools were randomly selected and were representing all regions of the island. Two hundred fifty-two of the students participated in all measurement points and provided valid data ( $M$  age = 10.48 years,  $SD$  = 0.50 years; 132 girls, 120 boys; 95% response rate).

## Measures

### Perceived autonomy support

Students' perceptions of teacher-initiated autonomy support were measured via Perceived Autonomy Support Scale for Exercise Settings (Hagger et al., 2007). The scale consists of 12 items measuring a single factor. An example item is "I feel that my physical education teacher makes sure I really understand the goals of the lesson and what I need to do." Responses were recorded on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale showed high and acceptable internal consistency ( $\alpha$  = .89).

### Motivational regulations in physical education

The Perceived Locus of Causality Scale (Ryan & Connell, 1989) modified for physical education (Goudas & Biddle, 1994) was used to measure students' motivational regulations in the physical education lessons. The scale includes a stem question (i.e., "I participate in physical education") followed by items measuring four motivational regulations, namely intrinsic motivation (e.g., "Because it is fun"), identified regulation (e.g., "It is important for me to participate"), introjected regulation (e.g., "I would feel bad if I do not"), and external regulation (e.g., "Because important others want me to do it"). Responses were anchored in a 4-point Likert-type scale ranging from 1 (*disagree a lot*) to 4 (*very much agree*).

### Enjoyment/effort

The two respective subscales from the Intrinsic Motivation Inventory (McAuley, Duncan, & Tammen, 1989) were used to measure enjoyment and effort in physical education lessons. Each subscale consists of three items (example items for enjoyment: "I exercise because it is fun"; example item for effort: "I exercise because it is important to make the effort"). Responses were given in a 7-point Likert-type scale with a range between 1 (*not true at all*) to 7 (*very true*). Both scales demonstrated acceptable internal consistency coefficients ( $\alpha$  = .71 for enjoyment and  $\alpha$  = .64 for effort).

### Motivational regulations in leisure time

Mullan, Markland, and Ingledew's (1997) Behavioural Regulations in Exercise Questionnaire was used to measure motivational regulations in a leisure time context. Participants responded to the stem question "I participate in

leisure time physical activity" followed by items assessing four motivational regulations; intrinsic motivation (e.g., "I like exercise";  $\alpha$  = .66 for this subscale), introjected regulation (e.g., "I feel guilty if I do not";  $\alpha$  = .68 for this subscale), identified regulation (e.g., "I think it is important to exercise regularly in my leisure time";  $\alpha$  = .73 for this subscale), and external regulation (e.g., "I exercise because others say I should";  $\alpha$  = .71 for this subscale). Participants provided their responses on a 7-point Likert-type scale with a range from 1 (*not true at all*) to 7 (*very true*).

### Theory of planned behavior

A questionnaire based on the recommendations made by Ajzen (2002) was used to measure the variables of the planned behavior theory, namely intentions, attitudes, perceived behavioral control and subjective norms. Intentions were measured via three questions (e.g., "I intend to do active sports or vigorous physical activities in the next 3 weeks") on 7-point Likert-type scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Attitudes were assessed in response to the following question: "Participating in active sports and/or vigorous physical activities during my LT in the next 3 weeks is ..." Responses were measured on four 7-point semantic differential scales with the following four bipolar adjectives: *bad-good*, *boring-interesting*, *unenjoyable-enjoyable*, and *useful-useless*. Subjective norms were measured by two items (e.g., "People important to me think that I should do active sports and/or vigorous physical activities during my leisure time in the next 5 weeks") on 7-point Likert-type scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Perceived behavioral control was assessed through three items (e.g., "I feel in complete control over whether I do active sports and/or vigorous physical activities in my leisure time in the next 3 weeks") measured on 7-point Likert-type scales ranging from 1 (*no control*) to 7 (*complete control*). All scales showed satisfactory and acceptable reliability coefficients ( $\alpha$  = .63 for intentions,  $\alpha$  = .88 for attitudes,  $\alpha$  = .73 for perceived behavioral control).

### Experimental design

School classes were randomly assigned into three groups; two intervention groups and one control group. In the first intervention group (Group A; various forms of dance) 76 students participated ( $M$  = 10.44 years,  $SD$  = 0.50 years; 37 girls, 39 boys). In the second intervention group (Group B; Greek traditional dances) 95 students took part ( $M$  = 10.57 years,  $SD$  = 0.49 years; 49 girls, 46 boys). Last, 81 students ( $M$  = 10.39 years,  $SD$  = 0.49 years; 46 girls, 35 boys) were assigned to the control group. In all groups, the intervention lasted six weeks, two physical education lessons per week. According to the Greek curriculum for physical education in elementary school, six weeks is the typical period of teaching a sport discipline (e.g., basketball, athletics, Greek traditional dances). The students of the intervention Group A attended lessons involving various forms of dance. Specifically, the program included two hr of each of the following dance

**Table 1.** Descriptive statistics of the study's variables.

	Total sample		Intervention group A		Intervention group B		Control group C	
	<i>M</i>	<i>SD</i>	<i>SD</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Autonomous support <sup>a</sup>	5.41	1.03	4.78	1.13	5.48	0.88	5.94	.74
Autonomous support <sup>b</sup>	5.23	1.10	5.83	0.60	5.33	0.92	4.55	1.28
PE introjection <sup>a</sup>	3.05	0.84	3.07	0.89	3.08	0.82	2.98	0.83
PE introjection <sup>b</sup>	3.01	0.80	3.00	0.87	3.10	0.75	2.93	0.80
PE external regulation <sup>a</sup>	2.90	0.86	2.97	0.80	3.07	0.76	2.62	0.96
PE external regulation <sup>b</sup>	2.98	0.81	2.80	0.88	3.08	0.72	3.04	0.81
PE identification <sup>a</sup>	3.70	0.51	3.73	0.45	3.58	0.59	3.82	0.43
PE identification <sup>b</sup>	3.58	0.67	3.80	0.43	3.47	0.69	3.50	0.78
PE intrinsic motivation <sup>a</sup>	3.81	0.38	3.84	0.31	3.77	0.40	3.83	0.41
PE intrinsic motivation <sup>b</sup>	3.59	0.62	3.71	0.48	3.58	0.60	3.47	0.75
Enjoyment <sup>a</sup>	6.17	0.98	6.14	1.05	6.13	1.07	6.24	0.80
Enjoyment <sup>b</sup>	5.86	1.33	6.26	0.89	5.97	1.15	5.35	1.68
Effort <sup>a</sup>	5.98	1.03	5.88	0.99	5.99	1.05	6.08	1.05
Effort <sup>b</sup>	5.83	1.18	6.00	0.91	5.97	1.11	5.45	1.39
PA introjection <sup>a</sup>	4.66	1.65	4.39	1.73	4.56	1.67	5.00	1.50
PA introjection <sup>b</sup>	4.33	1.74	4.36	1.74	4.51	1.72	4.09	1.76
PA external regulation <sup>a</sup>	4.12	1.64	3.94	1.67	4.35	1.66	4.09	1.57
PA external regulation <sup>b</sup>	4.06	1.69	3.82	1.62	4.27	1.69	4.10	1.76
PA identification <sup>a</sup>	6.16	1.11	6.25	1.05	5.87	1.28	6.44	0.87
PA Identification <sup>b</sup>	5.82	1.36	6.36	0.82	5.76	1.34	5.41	1.61
PA intrinsic motivation <sup>a</sup>	5.92	1.21	6.17	0.99	5.64	1.35	6.03	1.16
PA intrinsic motivation <sup>b</sup>	5.76	1.26	6.19	0.89	5.69	1.24	5.49	1.67
Intention <sup>a</sup>	4.78	1.18	4.73	1.11	4.78	1.29	4.84	1.13
Intention <sup>b</sup>	4.63	1.07	4.88	0.86	4.67	1.11	4.37	1.15
Attitudes <sup>a</sup>	5.38	0.98	5.42	1.06	5.14	1.08	5.65	0.68
Attitudes <sup>b</sup>	5.27	1.05	5.54	0.45	5.26	1.18	5.03	1.23
PBC <sup>a</sup>	5.80	1.21	5.93	1.20	5.92	1.19	5.89	1.23
PBC <sup>b</sup>	5.87	1.14	6.08	1.01	5.78	1.20	5.76	1.17
SN <sup>a</sup>	4.65	1.50	4.98	1.54	4.57	1.54	4.45	1.39
SN <sup>b</sup>	4.69	1.61	4.73	1.49	4.59	1.68	4.78	1.64

Note. PA = physical activity; PBC = perceived behavioral control; PE = physical education; SN = subjective norms.

<sup>a</sup>Pre-intervention measurement.

<sup>b</sup>Post-intervention measurement.

forms; aerobic dance, body expression, hip-hop, zumba, Greek traditional dances, and free choreography. Aerobic dance involves performing rhythmic steps accompanied by music regardless of child's body type and abilities. Body expression is another type of dance that supports child's autonomy and allows the participant to express feelings and feel comfortable with his/her body. Hip-hop is also a dance without specific movement patterns that allow children to create new combinations based on their own interests and abilities. Furthermore, zumba, is a type of dance that allows children to adjust the movement patterns to their own abilities. In addition, traditional dances were included in the intervention as being part of the national curriculum and reflecting an important aspect of children's tradition and cultural heritage. However, as Greek traditional dances incorporate specific movement patterns that decrease students' autonomy, specific actions were taken to allow students to take initiatives during the lesson. For instance, students selected the dances and songs to be taught and chose their dance mates during the lesson. Finally, students composed their own choreography using dance's patterns learned and experimented in the previous lessons.

The students assigned in the intervention Group B were taught Greek traditional dances for three weeks, while the remaining three were taught the games proposed by the national curriculum. The purpose of including this group was to test the effectiveness of Group A in comparison w

a set of lessons involving dance, but in the form it is regularly taught. In the first three weeks, students were taught volleyball, while the remaining three weeks were taught the following Greek traditional dances: *syrtos sta tria*, *kalamatianos*, *tsamiko*, *zonaradiko*, *fisouni*, and *rouga*. Students in control Group C were taught the games of the national curriculum. The purpose of this group was to compare the effectiveness of Group A with the regular topics taught in physical education without any element of dance and music. According to the national curriculum, the command and practice styles (Moston & Ashworth, 1990) are typically used to teach the proposed activities for Grades 5 and 6: basketball (8 hr), volleyball (8 hr), football (8 hr), handball (8 hr), gymnastics (8 hr), athletics (12 hr), and Greek traditional dances (12 hr; Digelidis, Theodorakis, Zetou, & Dimas, 2006).

## Procedure

Permission was obtained from local regional authorities, school principals, and physical education teachers to conduct the study. Students' parents received a preprint form with information about the study and asking them to sign it and return it to the physical education teacher, if they did not wish their child to take part in the study. No signed forms were returned. Students in all groups completed a battery of questionnaires before and immediately after the intervention (or six weeks for the control group). In each

**Table 2.** Correlation analysis of the study's variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. AS		.08	.02	.17**	.19**	.36**	.25**	.21**	.19**	.23**	.24**	.17**	.24**	.11	.09
2. PE In	.18**		.43**	.20**	.04	.15*	.17**	.35**	.41**	.18**	.14*	.21**	.01	.04	.23**
3. PE E	-.05	.38**		.14*	-.07	.16**	.20**	.26**	.34**	.09	.03	.05	-.08	-.00	.21**
4. PE Id	.35**	.32**	.09		.27**	.37**	.35**	.18**	.06	.41**	.22**	.22**	.11	.14*	.08
5. PE Im	.38**	.10	-.01	.39**		.38**	.16**	-.01	-.06	.22**	.00	.09	.19**	.05	.01
6. En	.57**	-.07	-.09	.39**	.47**		.42**	.12*	.10	.16**	.34**	.16**	.24**	.12	.11
7. Ef	.43**	.20**	.00	.29**	.32**	.59**		.20**	.22**	.20**	.30**	.20**	.12	.11	.06
8. PA In	.25**	.40*	.29**	.20**	.04	.20**	.20**		.67**	.36**	.34**	.31**	.09	.04	.30**
9. PA E	.10	.35**	.27**	.05	-.06	.05	.15*	.66**		.23**	.19**	.26**	.01	-.00	.37**
10. PA Id	.44**	.16**	.08	.40**	.30**	.32**	.44**	.35**	.18**		.65**	.30**	.27**	.29**	.26**
11. PA Im	.43**	.08	.34**	.34**	.57**	.52**	.45**	.30**	.11	.68**		.29**	.22**	.31**	.20**
12. Int	.35**	.17**	.13*	.21**	.21**	.32**	.34**	.05	.18**	.39**	.35**		.28**	.36**	.26**
13. Att	.36**	.11	.03	.35**	.31**	.31**	.30**	.16**	.03	.41**	.36**	.32**		.35**	.13*
14. PBC*	.31**	.15*	.09	.31**	.26**	.35**	.31**	.19**	.15*	.47**	.40**	.48**	.42**		.32**
15. SN*	.11	.25**	.26**	.05	-.04	.03	.06	.42**	.48**	.22**	.22**	.30**	.06	.32**	

Note. Above the diagonal, the correlations in the preintervention measurement are reported; below the diagonal, those of the postintervention measurement.

AS = autonomous support; Att = attitudes; Ef = effort; En = enjoyment; Int = intention; PA E = physical activity external; PA Id = physical activity identification; PA Im = physical activity intrinsic motivation; PA In = physical activity introjection; PBC = perceived behavioral control; PE Id = physical education identification; PE Im = physical education intrinsic motivation; PE In = physical education introjection; SN = subjective norms.

\* $p < .05$ . \*\* $p < .001$ .

measurement point a two-way prospective design was employed with a one-week interval. The first set of measures included the variables of planned behavior and motivational regulations in leisure time physical activity. The second set of measures included perceptions of teacher-initiated autonomy support, motivational regulations in physical education and self-reported leisure time physical activity. The same procedure was followed in all measurements. Students completed the questionnaires anonymously in quiet conditions in the class supervised by trained research associates. Students received both written and oral instructions regarding the completion of the questionnaires and were informed about their ability to withdraw any time they wish so. Also, they were reassured about the confidentiality of their responses and their use solely for research goals. The completion of the questionnaires lasted approximately 20 min. Students were matched across the measurement points based on their, class, gender and date of birth.

## Data analysis

Data were analyzed with SPSS 21.0. Data were analyzed using descriptive and inferential statistics. The internal consistency of the tested variables was estimated with Cronbach's  $\alpha$ . The study's hypotheses were tested via analysis of variance with repeated measures. The significance level was set at .05.

## Results

### Descriptive statistics

Means and standard deviations of the measures used in the study are reported in Table 1. The correlations among the study's variables are shown in Table 2. The results of the correlation analysis demonstrated low to moderate correlations among the motivational variables in physical education and leisure time physical activity, and among students' beliefs. The same pattern of correlations emerged in both measurement points.

## Effects of the intervention

### Motivation-related variables

The results of the analysis of variance with repeated measures demonstrated a significant group by time interaction in perceptions of autonomy supportive climate,  $F(2, 248) = 85.57$ ,  $p < .001$ ,  $\eta^2 = .40$ . The post hoc analyses revealed a significant increase in perceptions of autonomy supporting climate in intervention Group A ( $M = 4.78$  in the pre-intervention,  $M = 5.83$  in the post-intervention measurement), whereas scores remained rather stable in intervention Group B ( $M = 5.48$  in the preintervention,  $M = 5.33$  in the postintervention measurement) and significantly decreased in the control group ( $M = 5.94$  in the pre-intervention,  $M = 4.55$  in the post-intervention measurement).

Similarly, a significant group by time interaction was found in students' perceptions of external regulation in physical education,  $F(2, 248) = 6.48$ ,  $p < .001$ ,  $\eta^2 = .050$ , and intrinsic motivation in physical education,  $F(2, 248) = 4.34$ ,  $p < .001$ ,  $\eta^2 = .034$ . With respect to external regulation in physical education, the post hoc analyses showed a significant increase from pre- to post-intervention in the control group ( $M = 2.62$  and  $M = 3.04$ , respectively), while scores remained stable in the intervention Group B ( $M = 3.07$  and  $M = 3.08$  in the pre- and post-intervention measurements, respectively) and significantly decreased in the intervention Group A ( $M = 2.97$  and  $M = 2.80$  in the pre- and post-intervention measurements, respectively). Regarding intrinsic motivation in physical education, the post hoc tests indicated a significant increase in intervention Group A ( $M = 3.73$  in the pre-intervention,  $M = 3.80$  in the post-intervention measurement), whereas scores decreased in intervention Group B ( $M = 3.58$  in the pre-intervention,  $M = 3.47$  in the post-intervention measurement) and control group ( $M = 3.82$  in the pre-intervention,  $M = 3.50$  in the post-intervention measurement).

Similarly with respect to leisure time physical activity motivational regulations, a significant group by time interaction effect emerged introjected regulation,  $F(2, 247) =$

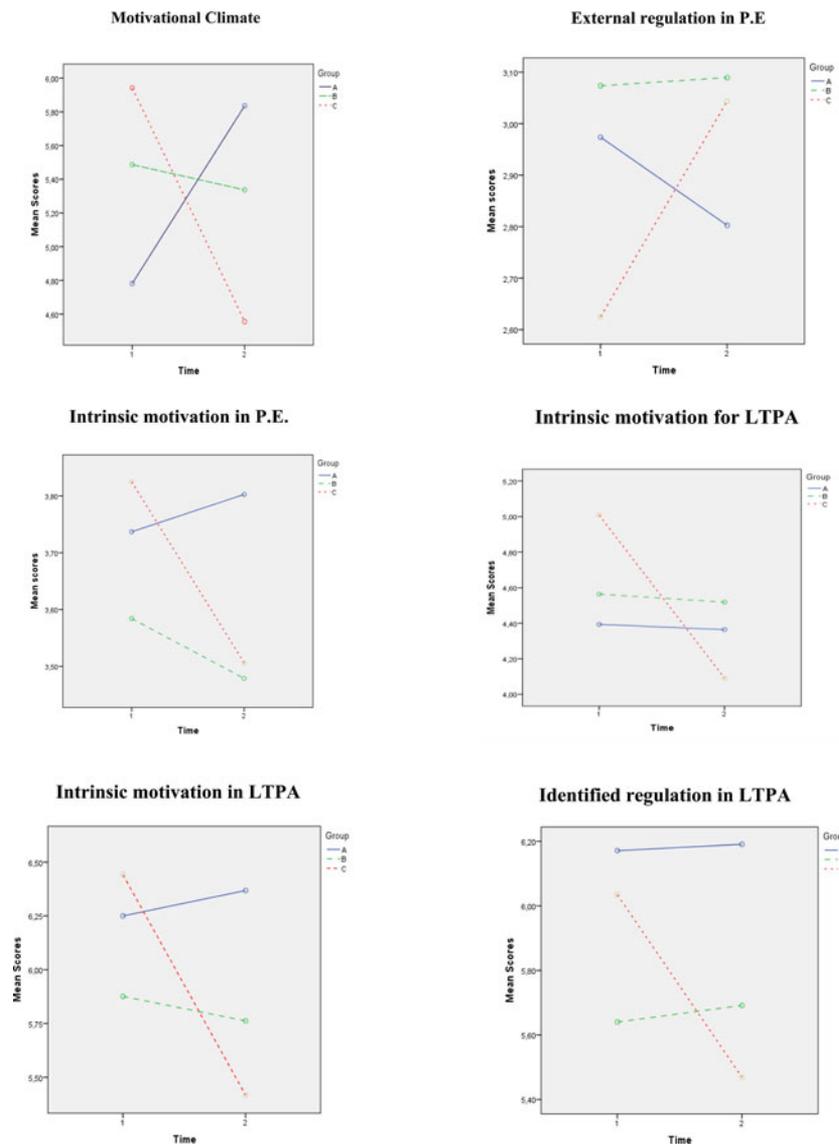


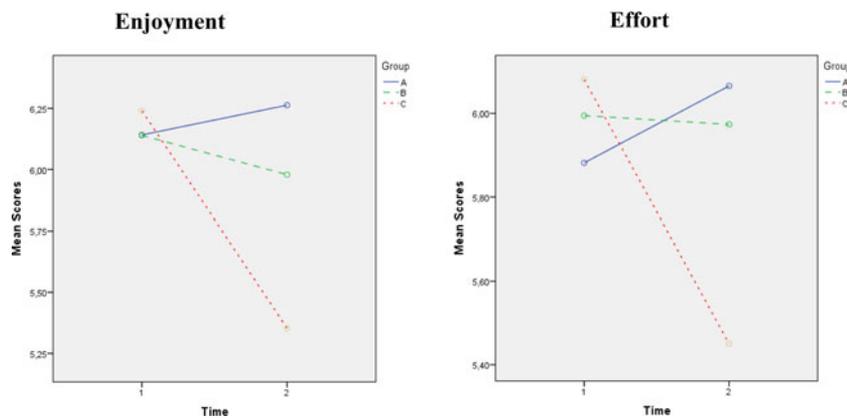
Figure 1. Time by group interactions on the motivation-related variables. LTPA = leisure time physical activity; PE = physical education.

11.40,  $p < .001$ ,  $\eta^2 = .085$ ), identified regulation,  $F(2, 247) = 4.07$ ,  $p < .05$ ,  $\eta^2 = .032$ , and intrinsic motivation,  $F(2, 247) = 5.02$ ,  $p < .05$ ,  $\eta^2 = .039$ . With respect to leisure time physical activity introjected regulation, the results of the post hoc analyses showed that scores significantly increased in the intervention Group A ( $M = 6.25$  in the pre-intervention and  $M = 6.36$  in the post-intervention measurement), remained stable in intervention Group B ( $M = 5.87$  in the pre-intervention and  $M = 5.76$  in the post-intervention measurement), and decreased in the control group ( $M = 6.44$  in the pre-intervention and  $M = 5.41$  in the post-intervention measurement). Regarding identified regulation, scores remained stable in both intervention groups ( $M = 6.17$  in the pre-intervention and  $M = 6.19$  in Group A;  $M = 5.64$  in the pre-intervention and  $M = 5.69$  in the post-intervention measurement in Group B). However, a significant decrease was observed in the scores of control group ( $M = 6.03$  and  $M = 5.49$  in the pre- and post-intervention measurements, respectively). Similarly, scores of leisure time physical activity intrinsic motivation remained stable in

intervention groups A and B ( $M = 4.39$  and  $M = 4.36$  in the pre- and post-intervention measurements, respectively, in Group A;  $M = 4.56$  and  $M = 4.51$  in the pre- and post-intervention measurements, respectively, in Group B), whereas a significant decrease was observed in the scores of control Group C ( $M = 5.00$  and  $M = 4.09$  in the pre- and post-intervention measurements, respectively). No significant group by time interaction emerged for external regulation.

### Students' responses in physical education

The results of the analysis of variance with repeated measures indicated a significant group by time interaction in both enjoyment,  $F(2, 248) = 9.58$ ,  $p < .001$ ,  $\eta^2 = .072$ , and effort,  $F(2, 248) = 6.45$ ,  $p < .001$ ,  $\eta^2 = .049$ . For both enjoyment and effort the results of the post hoc analyses demonstrated that scores in intervention groups A and B remained stable ( $M = 6.14$  and  $M = 6.26$  in the pre- and post-intervention measurements, respectively, in Group A for enjoyment,



**Figure 2.** Time by group interactions on students' responses in physical education.

and  $M = 6.13$  and  $M = 5.97$  in the pre- and post-intervention measurements, respectively, in Group B for enjoyment;  $M = 5.88$  to  $M = 6.00$  in the pre- and post-intervention measurements, respectively, in Group A for effort, and  $M = 5.99$  and  $M = 5.97$  in the pre- and post-intervention measurements, respectively, in Group B for effort), but significantly decreased in the control group ( $M = 6.24$  and  $M = 5.35$  for enjoyment;  $M = 6.08$  and  $M = 5.45$  in the pre- and post-intervention measurements, respectively, for effort; Figures 1 and 2).

### Theory of planned behavior variables

The results of the analysis showed a significant group by time interaction,  $F(2, 247) = 3.14$ ,  $p < .05$ ,  $\eta^2 = .025$ , in intentions for leisure time physical activity participation. The post hoc analysis showed that scores increased in the intervention Group A ( $M = 4.73$  in the pre-intervention to  $M = 4.88$  in the post-intervention), whereas a decrease was observed in intervention Group B ( $M = 4.78$  in the pre-intervention,  $M = 4.67$  in the post-intervention measurement) and control Group C ( $M = 4.84$  in the pre-intervention,  $M = 4.37$  in the post-intervention measurement). Furthermore, the analysis results showed a significant interaction,  $F(2, 247) = 7.26$ ,  $p < .05$ ,  $\eta^2 = .056$ , in attitudes toward leisure time physical activity. The post hoc analyses revealed that scores increased both in intervention Group A ( $M = 5.42$  in the preintervention to  $M = 5.54$  in the post-intervention measurement) and intervention Group B ( $M = 5.14$  in the pre-intervention to  $M = 5.26$  in the post-intervention measurement), whereas decreased in the control Group C ( $M = 5.65$  in the pre-intervention to  $M = 5.03$  in the post-intervention measurement). No statistically group by time interaction in perceived behavioral control and subjective norms for leisure time physical activity was found (Figure 3).

### Discussion

The present study investigated the effectiveness of a program involving autonomy supportive dancing activities in promoting students' motivation for physical education and for leisure time physical activity, positive experiences in physical education classes and positive beliefs toward leisure time

physical activity as compared with two alternative programs based on the national curriculum. The results of the analyses supported the study's hypotheses by indicating a positive effect of the autonomy supportive dancing activities on most of the measures used in the study.

More specifically, students in Group A reported higher perceptions of autonomy support in the lesson. These findings are in line with studies on dance suggesting that using free dance forms allows people to better express themselves, and thus feel more autonomous (Cholod & Downey, 1997; Sebire et al., 2016; Von Rossberg-Gempton et al., 1999). Importantly, these findings suggest that using activities that are inherently autonomous, such as free dance activities, in the physical education lesson can provide alternatives for the teacher who wishes to establish an autonomy supportive climate. These activities provide students with opportunities to self-regulate their own learning and performance. In this sense, these activities allow students to more actively engage in the learning process, work at their own pace, not being worried about receiving negative criticism (i.e., reducing evaluation apprehension), and they also provide opportunities for positive reinforcement by emphasizing personal improvement and through establishing rapport with their teammates and the teacher. Therefore, they assist teacher in establishing an autonomy supportive climate (Reeve, 2009; Reeve & Jang, 2006).

The intervention also had a positive effect on autonomous motivation in physical education and leisure time physical activity. These findings are in line with past evidence suggesting that autonomous support in physical education leads to autonomous motivation in physical education and leisure time physical activity (Barkoukis et al., 2010; Hagger & Chatzisarantis, 2016; Hagger et al., 2003). Importantly, these findings indicate that the content of the physical education can influence students' motivational regulations, and imply that autonomy support can foster adaptive forms of motivation through the teacher's interpersonal approach or through the activities used. Interestingly, autonomy supportive activities influenced autonomous motivation in leisure time physical activity. Past evidence had implied the direct association between autonomy supportive climate and autonomous motivation in leisure time physical activity (Barkoukis & Hagger, 2013; Barkoukis et al., 2010). The

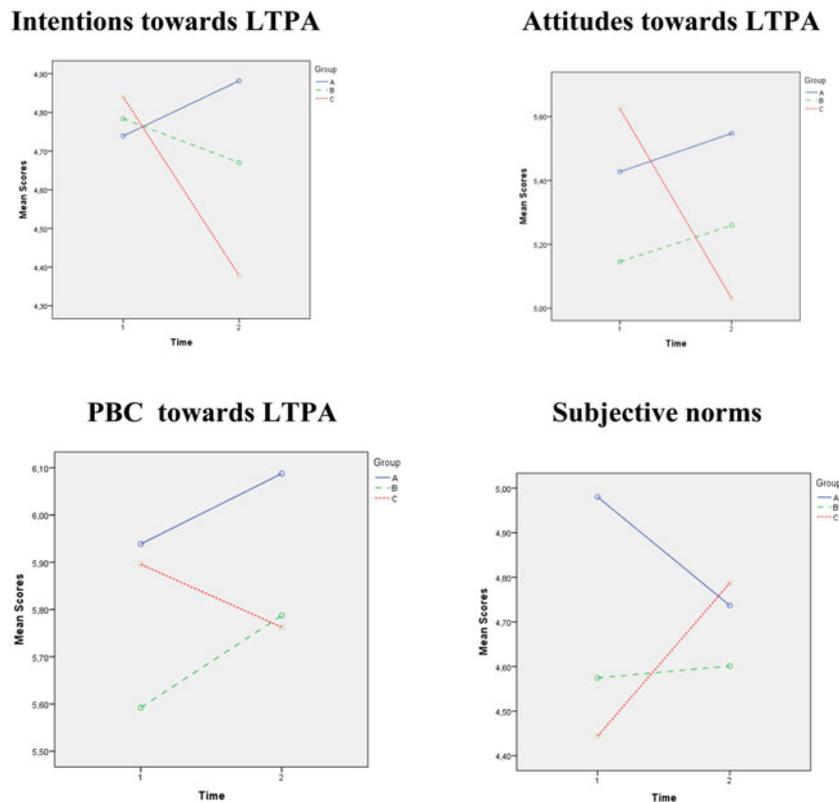


Figure 3. Time by group interactions on the planned behavior variables. LTPA = leisure time physical activity.

present findings further support this notion and suggest that using autonomy supportive activities can foster both lesson-specific and out-of-school motivation.

Furthermore, a positive effect of the intervention was observed on students' responses from the lesson. Enjoyment and effort remained stable in both intervention groups that involved free dancing activities, whereas they decreased in the control group. Clearly a more positive influence on enjoyment and effort was expected. This absence of higher enjoyment and effort could be attributed to gender differences. Free dancing activities have been found to be very enjoyable to girls, whereas in several instances boys were feeling uncomfortable in performing such activities (Risner, 2009; Shen, Chen, Tolley, & Scrabis, 2003). Thus, the lack of improvement in the intervention groups might be ascribed to the lower scores reported by boys. Still, further research is needed to investigate the role of gender in performing free dancing activities in the physical education lesson. However, free dancing activities maintained enjoyment and effort stable. This is extremely important considering that a lesson involving games, which is typical in physical education curricula, reduced them both. These findings imply that such activities provide opportunities for many students, probably those underperforming in games, to support their autonomy and enjoy the lesson. Thus, it seems that these activities can at least reverse the negative effect of a typical physical education lesson on students' affective outcomes from participation in the physical education lesson.

Finally, the intervention had a positive effect on cognition toward leisure time physical activity, especially attitudes and intentions. Past evidence using the trans-

contextual model of motivation suggested that autonomy supportive climate indirectly influenced attitudes and intentions toward leisure time physical activity (Hagger & Chatzisarantis, 2016; Hagger et al., 2003; Hagger et al., 2005). The findings of the present study supports this evidence and indicates that autonomy supportive activities in the lesson can elevate students' attitudes and intentions toward leisure time physical activity. This effect was probably a result of the changes observed in autonomous motivation in physical education and leisure time physical activity, enjoyment and effort. Future studies should further test this mediation effect. Still, this is a very important finding suggesting that autonomous supportive activities in physical education can influence cognition related to leisure time physical activity. This is in line with the trans-contextual model of motivation and highlights the important role school physical education can play in the promotion of leisure time physical activity in children.

On the other hand, the intervention did not produce any effect on students' subjective norms and perceived behavioral control. These results can be ascribed to the age of the students. Elementary school students largely rely on their parents with respect to leisure time physical activity. However, the present study did not involve activities aiming to change parents' beliefs or behaviors toward physical activity. As a result, students' perceptions related to parents' beliefs and the easiness of participating in physical activities remained unchanged.

Although the study provided strong evidence on the effect of the intervention on students' cognition and beliefs, it is not free of limitations. Firstly, intervention Group B

included a mixture of free- and specific-form dances. This combination of subjects is not typical in physical education curricula. However, it offered a comparison between lessons with dancing activities and games. Secondly, the study's data were based on self-reports. No objective measures were used. Although this approach is typical in physical education research, the present study's participants were fifth- and sixth-grade students. Although the measures used in the present study were used in previous research with similar age groups (Ntovolis, Barkoukis, Michelinakis, & Tsorbatzoudis, 2015), students in the present study probably scored higher in their responses to teacher behavior, motivation and enjoyment, suggesting a ceiling effect. One possible explanation for this effect is that the physical education classes can be more joyful than, say, STEM classes and this may have been reflected in students' responses about their teachers. Nevertheless, the present study provides strong evidence that autonomy supportive activities can assist the physical education teacher increase autonomy support in the lesson.

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